Amendment to the Claims

1.   (Previously Amended). A method for remotely managing an IP device via a synchronous optical network, comprising:

receiving IP packets from a remote IP management device at a local IP gateway connected to the synchronous optical network; and

routing the IP packet to an IP tunneling layer network interface, wherein the IP tunneling layer network interface translates the IP packet to a second protocol to be transmitted over a data communications channel in overhead of frames in the synchronous optical network to a remote IP gateway connected to the IP device.

2.   Previously Canceled.

3.   (Previously Amended). The method of claim 1, further comprising:

establishing an IP tunnel interface comprising a network address for uniquely identifying the remote IP gateway in the second communications protocol, an interface number for reaching said network address, and an IP address for said IP device to transmit an IP packet.

4.   (Previously Amended). The method of claim 3, wherein the remote IP gateway includes a table indicating the IP address of the second IP device.

5.   (Previously Amended). The method of claim 4, wherein the remote IP gateway receives the IP address for the IP device from the local IP gateway via the data communications channel over the synchronous optical network and sends the IP packet to the IP device using an IP protocol.

6.   (Previously Amended). The method of claim 1, wherein said second communications protocol comprises CLNP and the synchronous optical network is a SONET network.

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7.-23. Previously Canceled.

24. (Previously added) A network element connected between an IP network and a synchronous optical network, comprising:

a first interface for receiving IP packets from the IP network;

a routing table for storing information about IP devices connected to network elements in the synchronous optical network; and

an IP tunneling layer network interface that translates the IP packets into a second protocol to be communicated over a data communication channel in overhead of synchronous optical frames in the synchronous optical network and wherein the routing table is used to determine a destination network element in the synchronous optical network.

25. (Previously added) The network element in claim 24, wherein the routing table associates an IP destination address with a specific port of the network element.

26. (Previously added) The network element in claim 25, wherein the second protocol is connection less network protocol (CLNP) and the synchronous optical network is a SONET network.

27. (New) A network element that provides a gateway between a local internet protocol (IP) device and a synchronous optical network to provide remote management of one or more remote IP devices, comprising:

a line driver element that communicates with the local IP device and receives IP packets with a destination address to one or more remote IP devices;

one or more routing tables for providing routing information for IP tunnels through the synchronous optical network to a destination network element with functionality to provide a gateway to the one or more remote IP devices, wherein the one or more routing tables assign

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network ports in the network element for routing to each of the one or more remote IP devices through the destination network elements;

an internet protocol tunneling layer network interface that translates IP packets received by the network element into a second protocol;

a synchronous optical network port that transmits the translated IP packet over a data communication channel in overhead of synchronous optical frames in the synchronous optical network, wherein the network port was selected in response to the routing tables and destination address of the remote IP device.